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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

Report Date: May 17, 2018 17:03

Project: Solvay

Account #: 20003
Group Number: 1939874
State of Sample Origin: NJ

Regulatory agencies do not accredit laboratories for all methods, analytes, and matrices. Our current scopes of accreditation can be viewed at http://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/resources/certifications/ . To request copies of prior scopes of accreditation, contact your project manager.

Electronic Copy To	Solvay	Attn: Mitch Gertz
Electronic Copy To	Solvay	Attn: Mark Christensen
Electronic Copy To	Integral Consulting Inc.	Attn: Erin Palko
Electronic Copy To	Integral Consulting Inc.	Attn: Craig Hutchings

Respectfully Submitted,

Lyssa M. Longenecker
Specialist

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
V-915 Grab Water	04/25/2018 09:00	9593655
Field Blank Grab Water	04/25/2018 09:00	9593656

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **V-915 Grab Water**

Project Name: **Solvay**

Integral Consulting Inc.
ELLE Sample #: **WW 9593655**
ELLE Group #: **1939874**
Matrix: Water

Submittal Date/Time: 05/04/2018 09:55
Collection Date/Time: 04/25/2018 09:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14473	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.89	1
14473	Perfluorodecanoic acid	335-76-2	11	0.89	1.8	1
14473	Perfluorododecanoic acid	307-55-1	N.D.	0.27	0.89	1
14473	Perfluoroheptanoic acid	375-85-9	28	0.27	0.89	1
14473	Perfluorohexanesulfonate	355-46-4	1.3 J	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	12	0.36	1.8	1
14473	Perfluorononanoic acid	375-95-1	1,500	36	180	100
14473	Perfluoro-octanesulfonate	1763-23-1	4.4	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	290	0.27	0.89	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.27	0.89	1
14473	Perfluorotridecanoic acid	72629-94-8	0.30 J	0.27	0.89	1
14473	Perfluoroundecanoic acid	2058-94-8	28	0.36	1.8	1

The recovery for the sample internal standard(s) and sample labeled compound(s) used as extraction standards is outside the QC acceptance limits. The following corrective action was taken: the sample was reinjected and similar recoveries were observed for the internal and textraction standards.

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18126003	05/12/2018 01:13	Devon M Whooley	1
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18126003	05/16/2018 07:44	Devon M Whooley	100
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18126003	05/07/2018 08:10	Courtney J Fatta	1

*=This limit was used in the evaluation of the final result

Sample Description: **Field Blank Grab Water**

Project Name: **Solvay**

Integral Consulting Inc.
ELLE Sample #: **WW 9593656**
ELLE Group #: **1939874**
Matrix: Water

Submittal Date/Time: 05/04/2018 09:55
Collection Date/Time: 04/25/2018 09:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14473	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.88	1
14473	Perfluorodecanoic acid	335-76-2	N.D.	0.88	1.8	1
14473	Perfluorododecanoic acid	307-55-1	N.D.	0.26	0.88	1
14473	Perfluoroheptanoic acid	375-85-9	N.D.	0.26	0.88	1
14473	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	1.8	1
14473	Perfluorohexanoic acid	307-24-4	N.D.	0.35	1.8	1
14473	Perfluorononanoic acid	375-95-1	1.6 J	0.35	1.8	1
14473	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.35	1.8	1
14473	Perfluorooctanoic acid	335-67-1	N.D.	0.26	0.88	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.26	0.88	1
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	0.26	0.88	1
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	0.35	1.8	1

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18126003	05/12/2018 01:42	Devon M Whooley	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18126003	05/07/2018 08:10	Courtney J Fatta	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1939874
Reported: 05/17/2018 17:03

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 18126003	Sample number(s): 9593655-9593656		
Perfluorobutanesulfonate	N.D.	0.30	1.0
Perfluorodecanoic acid	N.D.	1.0	2.0
Perfluorododecanoic acid	N.D.	0.30	1.0
Perfluoroheptanoic acid	N.D.	0.30	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluoro-octanesulfonate	N.D.	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.30	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18126003	Sample number(s): 9593655-9593656								
Perfluorobutanesulfonate	4.81	5.32	4.81	5.05	111	105	73-128	5	30
Perfluorodecanoic acid	5.44	6.36	5.44	6.12	117	113	69-148	4	30
Perfluorododecanoic acid	5.44	6.12	5.44	6.17	112	113	75-136	1	30
Perfluoroheptanoic acid	5.44	6.59	5.44	6.43	121	118	76-140	2	30
Perfluorohexanesulfonate	5.14	5.68	5.14	5.37	110	104	71-131	5	30
Perfluorohexanoic acid	5.44	6.53	5.44	6.61	120	121	75-135	1	30
Perfluorononanoic acid	5.44	6.22	5.44	6.52	114	120	72-148	5	30
Perfluoro-octanesulfonate	5.20	5.80	5.20	5.72	111	110	67-138	1	30
Perfluorooctanoic acid	5.44	5.81	5.44	6.44	107	118	72-138	10	30
Perfluorotetradecanoic acid	5.44	6.05	5.44	5.90	111	108	74-135	2	30
Perfluorotridecanoic acid	5.44	6.41	5.44	6.67	118	123	61-145	4	30
Perfluoroundecanoic acid	5.44	5.66	5.44	5.94	104	109	75-146	5	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1939874
Reported: 05/17/2018 17:03

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 18126003

	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS
9593655	152*	54	64	59	49	69
9593656	77	80	73	76	76	79
Blank	82	73	73	78	78	88
LCS	74	71	66	74	82	79
LCSD	77	71	72	73	77	79
Limits:	26-148	31-128	34-126	35-126	43-112	43-115

	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA
9593655	64	57	60	63	52
9593656	102	87	78	83	77
Blank	92	84	74	76	67
LCS	82	77	72	73	70
LCSD	87	79	66	72	71
Limits:	32-134	40-115	30-128	28-127	26-119

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

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Acct. # 20003 Group # 1939874 Sample # 9593655-57

COC # 548840

Client Information

Client: Solvay | Acct. #:

Project Name/#: | PWSID #:

Project Manager: Gertz | P.O. #:

Sampler: Chalfen | Quote #:

State where samples were collected: NJ | For Compliance: Yes ☒ No ☐

Matrix

Soil ☐ Sediment ☐ Tissue ☐ | Water: Potable ☐ Ground ☐ NPDES ☒ Surface ☐ | Other: ____

Analysis Requested

Preservation Codes

For Lab Use Only

FSC:

SCR#: 224178

Preservation Codes

H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

Sample Identification	Collected Date	Collected Time	Grab	Composite	Total # of Containers	PFAS by LCMS/MS
V-915	4/25/18	0900	X		2	X
Field Blank	4/25/18	0900	X		1	X

Turnaround Time (TAT) Requested (please circle)

Standard Rush

(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: 5/25/18

E-mail address:

Data Package Options (circle if required)

Type I (EPA Level 3 Equivalent/non-CLP) | Type VI (Raw Data Only)

Type III (Reduced non-CLP) | NJ DKQP | TX TRRP-13

NYSDEC Category A or B | MA MCP | CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Bottle Storage	4-27-18	10:00	Bill D. Levy	4-27-18	10:00
Bill D. Levy	4-27-18			4/28/18	0930
	5/3/18	1500			
			R Reed	5/4/18	0955

EDD Required? Yes (No)

If yes, format:

Site-Specific QC (MS/MSD/Dup)? Yes (No)

(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS ____ FedEx X Other ____

Temperature upon receipt 4.1 °C

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Sample Administration Receipt Documentation Log

Doc Log ID: 215544

Group Number(s): 1939874

Client: Solvay

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	05/04/2018 9:55
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	NJ		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	No
Samples Chilled:	Yes	Total Trip Blank Qty:	1
Paperwork Enclosed:	Yes	Trip Blank Type:	HCl
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Raysa Perez (14020) at 12:45 on 05/04/2018

Samples Chilled Details

Thermometer Types: *DT = Digital (Temp. Bottle)* *IR = Infrared (Surface Temp)* *All Temperatures in °C.*

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT131	4.1	DT	Wet	Y	Bagged	N

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	non-detect
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.